

ABSTRACT OF THE DISCLOSURE

Additive and subtractive manufacturing processes are combined to produce objects having a desired geometry specified by a computerized description. According to the invention, a software system is provided which is capable of creating both additive and subtractive toolpaths, and automatically distinguishing between regions in which addition and subtraction must occur. The additive manufacturing aspect may include solid-state or fusion welding processes of all types (including but not limited to, arc welding, laser welding, resistance welding, friction welding, friction stir welding, ultrasonic welding, laser cladding, plasma welding), laser material deposition, metal spraying, adhesive bonding, vapor or electrochemical deposition and other processes not listed which may suggest themselves to those knowledgeable in the field. The subtraction aspect of the invention may include, but is not limited to milling and various types of cutting tools suited thereto, lasers, knives, hot wires, arc cutters, plasmas cutters, and other such methods of cutting and removing material as may suggest themselves.